**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1-62. (Cancelled)

63. (Previously presented) A Josephson junction structure comprising:

a substrate; and

a plurality of Josephson junction devices ~~of claim 1~~ formed on the substrate, each of the Josephson junction devices comprising:

an electrode formed on and epitaxial to the substrate, the electrode comprising a first superconductive oxide;

a barrier comprising a non-superconducting, ion-modified surface layer of the first superconductive oxide; and

a counter-electrode formed directly on and epitaxial to the barrier, the counter-electrode comprising a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode,

~~and~~ the plurality of Josephson junction devices having respective $I_c$ values with a 1-$\delta$ value within about 7.8% ~~of each other~~, and respective $R_n$ values with a 1-$\delta$ value within about 3.5% ~~of each other~~, at 4.2 K.

64. **(Currently amended)** The Josephson junction structure of claim 63, wherein the plurality of Josephson junctions comprise at least 10 Josephson junction devices ~~of claim 1~~ and having respective $I_c$ values with a 1-$\delta$ value within about 7.8% ~~of each other~~, and respective $R_n$ values with a 1-$\delta$ value within about 3.5% ~~of each other~~, at 4.2 K.

65. **(Currently amended)** ~~The Josephson junction device of claim 59~~A Josephson junction device, comprising:

a first layer comprising an oxide high-temperature superconductor;

a second layer comprising an oxide high-temperature superconductor; and

a third layer connecting the first and second layers and comprising a non-superconductor,

the first and third layers being formed from a starting oxide high-temperature superconductor layer of an oxide high-temperature superconductor, the third layer being an ion-modified portion of the starting oxide high-temperature superconductor layer, the first layer being an unmodified portion of the starting oxide high-temperature superconductor layer,

the device having an $R_nA$ value of about $1\times10^{-9}$ to about $3\times10^{-7}$ $\Omega$-cm$^2$ at 4.2 K.

66. (**Currently amended**) The Josephson junction device of claim 65[2], wherein the first layer comprises an YBCO superconducting oxide ~~having an $R_nA$ value of about $1\times10^{-9}$ to about $3\times10^{-7}$ $\Omega$-cm$^2$ at 4.2K~~.

67. (**Currently amended**) ~~The device of claim 1~~An electronic device comprising:

a crystalline substrate;

an electrode formed on and epitaxial to the substrate, the electrode comprising a first superconductive oxide;

a barrier comprising a non-superconducting, ion-modified surface layer of the first superconductive oxide; and

a counter-electrode formed directly on and epitaxial to the barrier, the counter-electrode comprising a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode, having an $R_nA$ value of about $1\times10^{-9}$ to about $3\times10^{-7}$ $\Omega$-cm$^2$ at 4.2 K.

68. (**Currently amended**) The device of claim 67, wherein the first and second superconductive oxides are YBCO ~~having an $R_nA$ value of about $1\times10^{-9}$ to about $3\times10^{-7}$ $\Omega$-cm$^2$ at 4.2K~~.

69. (**Currently amended**) The device of claim 67~~15~~, having an $R_nA$ value of at least about $6\times10^{-9}$ $\Omega$-cm$^2$ at 40 K.

70. (**Currently amended**) The device of claim 68~~21~~, having an $R_nA$ value of at least about $6\times10^{-9}$ $\Omega$-cm$^2$ at 40 K.

71. (**Currently amended**) ~~The Josephson junction device of claim 59~~A Josephson junction device, comprising:

a first layer comprising an oxide high-temperature superconductor;

a second layer comprising an oxide high-temperature superconductor; and

a third layer connecting the first and second layers and comprising a non-superconductor,

the first and third layers being formed from a starting oxide high-temperature superconductor layer of an oxide high-temperature superconductor, the third layer being an ion-modified portion of the starting oxide high-temperature superconductor layer, the first layer being an unmodified portion of the starting oxide high-temperature superconductor layer,

the device having a $J_c$ value of about $1\times10^3$ to about $5\times10^6$ A/cm$^2$ at 4.2 K.

72. (**Currently amended**) The Josephson junction device of claim 71~~62~~ wherein the first layer comprises an YBCO superconducting oxide~~, having a $J_c$ value of about $1\times10^3$ to about $5\times10^6$ A/cm$^2$ at 4.2K~~.

73. (**Currently amended**) ~~The Josephson junction device of claim 1~~An electronic device comprising:

a crystalline substrate;

an electrode formed on and epitaxial to the substrate, the electrode comprising a first superconductive oxide;

a barrier comprising a non-superconducting, ion-modified surface layer of the first superconductive oxide; and

a counter-electrode formed directly on and epitaxial to the barrier, the counter-electrode comprising a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode,

the device having a $J_c$ value of about $1\times10^3$ to about $5\times10^6$ A/cm$^2$ at 4.2 K.

74. **(Currently amended)** The Josephson junction device of claim 73[7], wherein the first and second superconductive oxides are YBCO~~having a $J_c$ value of about $1\times10^3$ to about $5\times10^6$ A/cm$^2$ at 4.2K~~.

75. **(New)** The Josephson junction device of claim 65, wherein the third layer is substantially uniform.

76. **(New)** A Josephson junction device, comprising:

a first layer comprising an oxide high-temperature superconductor;

a second layer comprising an oxide high-temperature superconductor; and

a third layer connecting the first and second layers and consisting essentially of a non-superconductor,

the first and third layers being formed from a starting oxide high-temperature superconductor layer of an oxide high-temperature superconductor, the third layer being an ion-modified portion of the starting oxide high-temperature superconductor layer, the first layer being an unmodified portion of the starting oxide high-temperature superconductor layer,

the device having an $R_nA$ value of about $1\times10^{-9}$ to about $3\times10^{-7}$ $\Omega$-cm$^2$ at 4.2 K.